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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/053,454	10/25/2001	Jerome L. Elkind	TI-30785	3557

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TEXAS INSTRUMENTS INCORPORATED
P O BOX 655474, M/S 3999
DALLAS, TX 75265

EXAMINER

SEVER, ANDREW T

ART UNIT	PAPER NUMBER
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2851

DATE MAILED: 07/14/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/053,454

Applicant(s)

ELKIND ET AL.

Examiner

Andrew T Sever

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-17 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-17 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 25 October 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on ____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. ____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). ____.
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 10252001. 6) ☐ Other: ____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claims 1-3, 7, 9, 10, and 14 are rejected under 35 U.S.C. 102(e) as being anticipated by Herrmann et al. (US 6,194,223.)

Herrmann et al. teaches in figure 1 a surface plasmon resonance sensor, comprising:

A source of polarized light at a selected wavelength (laser 2 produces the light and polarizer 6 polarizes the light);

A surface plasmon layer, comprising:

A resonance film (26), formed of a selected material to a selected thickness so that the polarized light from the source establishes surface plasmon resonance at a surface of the resonance film (inherent in a plasmon sensor and taught in column 4 lines 15-16), the surface plasmon resonance producing an evanescent wave extending away from the surface of the resonance film over a sensing range; and

A hard protective film overlying the surface of the resonance film, and having a thickness that is substantially less than the sensing range (Although this is not shown in figure 1 or any other figure, it is taught as an alternate embodiment in column 2

lines 27-42, specifically Herrmann teaches the well known combination of a metal/metal oxide combination which in lines 38-42 comprise of gold or silver for the metal layer (the plasmon resonance layer) and the use of one of a group of metal oxide layers);

A light transmissive medium disposed between the source and the surface plasmon layer (8 which is taught to be a prism and in column 4 lines 9-10 is taught to be glass); and

A photodetector array, for detecting intensity of polarized light reflected from the resonance film (14, which is taught to be a photodiode, it should be noted the 16 is also a photo detector array specifically a photomultiplier, however this is specified to be provided for the purpose of detecting fluorescence which is beyond the scope of the applicant's claimed invention).

With regards to applicant's claims 2, and 9:

Herrmann teaches that the sensor's hard protective film consists essentially of a material selected from the group consisting of silicon carbide, diamond-like carbon, silicon dioxide, silicon nitride, titanium oxide, titanium nitride, aluminum oxide, aluminum nitride, beryllium oxide, and tantalum oxide (see column 2 lines 41 and 42 which list the following oxides: silicon dioxide, titanium oxide, aluminum oxide).

With regards to applicant's claims 3 and 10:

Herrmann teaches that the resonance film comprises gold. (See column 2 line 40 which teaches that the noble metal is preferably gold or silver and also see column 4 line

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12 which teaches that in the example shown in figure 1 the metal layer is specifically a 50 nm thick gold layer.)

With regards to applicant's claims 7 and 14:

The source comprises:

A light-emitting diode (column 4 line 5-7 teaches that the light source is a laser diode a type of light emitting diode); and

A polarizing element disposed between the light-emitting diode and the surface plasmon layer (see figure 1 which clearly shown the polarizing element 6 is between the laser diode 2 and the surface plasmon layer 26).

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 4-6, 8, 11-13, 15-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Herrmann et al. (US 6,194,223) as applied to claims 1-3, 7, 9, 10, and 14 above, and further in view of Melendez et al. (US 5,912,456).

As described in more detail above, Herrmann et al. teaches a surface plasmon resonance sensor comprising a source of polarized light, a surface plasmon layer, a light

transmissive medium disposed between the source and the surface plasmon layer, and a photodetector array. The surface plasmon layer comprises a resonance film formed of gold at a selected thickness so that the polarized light from the source establishes surface plasmon resonance at a surface of the resonance film. The surface plasmon layer further is covered by a hard protective film formed of a material selected from the group consisting of silicon carbide, diamond-like carbon, silicon dioxide, silicon nitride, titanium oxide, titanium nitride, aluminum oxide, aluminum nitride, beryllium oxide, and tantalum oxide (as is claimed by applicant's claims 11-13 and 15).

Herrmann, however does not teach an intermediate mirror positioned relative to the photodetector array so as to reflect, to the photodetector array, polarized light reflected from the resonance film, Herrmann also does not teach enclosing the sensor in a housing. Melendez et al. teaches in figure 2 a plasmon sensor, which comprises a light source (42) a polarizer (48), a resonance film (54), and a photodetector array (58). Melendez's plasmon sensor is enclosed in a housing (52). Melendez further teaches the use of a mirror to redirect the polarized light reflected from the resonance film towards the photodetector array (58). Using mirrors to redirect light beams is well known in the optical arts and as explained by Melendez in column 4 lines 50-65 it is desirable to have the light beam strike the detector array at an angle close to 90 degrees while limiting the size and mechanical complexity of the plasmon sensor (see column 1 lines 15-60 of Melendez.) Since it is well known to redirect light beams with mirrors and since as taught by Melendez the housing structure shown in Melendez's figure 2 requires less alignment and is mechanically simpler than the prior art prism method taught by

Herrmann, it would have been obvious to one of ordinary skill in the art at the time the invention was made to enclose Herrmann's plasmon resonance sensor which has a hard protective film overlying the surface of the resonance film in a housing and use a mirror to redirect the beam as is taught by Melendez in order to make a more sturdy mechanically simpler plasmon resonance sensor.

With regards to applicant's claims 5, 6, 8, 12, 13, and 15:

As shown in figure 2 of Melendez the housing of Herrmann in view of Melendez is disposed over the source and the photodetector array which are physically mounted in a substrate with a plurality of leads as is claimed by applicant's claim 8. As taught by Melendez in column 4 line 66 to column 5 line 10 it is desirable to have the surface plasmon layer and intermediate mirror preferably formed on an exterior surface of the housing. Although Herrmann's plasmon layer differs from Melendez's (namely the addition of the hard layer), it would still be obvious and beneficial to place it on the exterior surface of the housing, since placing it on the interior of the housing would require opening the device to place a sample for testing, which one with ordinary skill in the art at the time the invention was made would recognize could introduce containments such as dust as well as cause mechanical jarring which would negatively affect the quality of the measurements. Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to mount the surface plasmon layer and intermediate mirror to the surface of the housing as is claimed in applicant's claims 5 and 6.

With regards to applicant's claim 16:

Hermann teaches in figure 1 an output device for outputting an indication based upon an angle at which polarized light is absorbed by a sample medium dispensed into the opening. (PC 24 inherently outputs the angle among other things.)

Conclusion

5. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

US 5,327,225 to Bender et al. teaches in figure 3a a plasmon sensor which has a metal layer (34) which then has a material placed over it (36), between it and the sample to be tested. In column 5 lines 14-15 the overlay is taught to be silicon monoxide.

US 5,415,842 to Maule teaches in its only figure a plasmon sensor having a metal layer (2) a protective layer (12) between the metal layer and the sample to be tested (3). In column 3 Maule teaches the protective layer is a thin layer of zirconia, which has similar chemical and physical properties to those materials claimed by the applicant in the present application. Further Maule teaches the thickness of the metal layer (23 nm) and of the zirconia layer (18 nm).

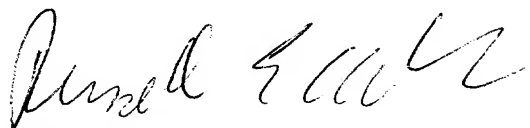
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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Andrew T Sever whose telephone number is 703-305-4036. The examiner can normally be reached on 8:30-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Russell Adams can be reached on 703-308-2847. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9318 for regular communications and 703-872-9319 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.

AS
July 10, 2003


RUSSELL ADAMS
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800